**DETERMINING FAIR AND REASONABLE
RATES UNDER COMPETITION:
RESPONSE TO MAJOR THEMES
AT THE FPSC WORKSHOP**

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NATIONAL ECONOMIC
RESEARCH ASSOCIATES

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Consulting Economists

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TABLE OF CONTENTS

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INTRODUCTION AND CONCLUSIONS

I. BACKGROUND

In the State of Florida, Chapter 364 of the Florida Statute required the Florida Public Service Commission ("FPSC") to study and report to the Legislature, by February 15, 1999, a "fair and reasonable rate" for residential basic local telecommunications service ("residential service") in the state. In response, the FPSC opened an undocketed Special Project (No. 980000A-SP) and conducted workshops on October 1-2 and 8-9. Participants at those workshops represented incumbent local exchange companies ("ILECs") and interexchange companies ("IXCs") in Florida, the Florida Competitive Carriers Association ("FCCA"), the American Association of Retired Persons ("AARP"), the Office of the Attorney General of Florida ("OAG"), the Office of Public Counsel in Florida ("OPC"), and other interested parties. The purpose of the workshops was to seek public comment from those interested parties on how a fair and reasonable rate for residential service should be established and the issues to which the FPSC should pay particular attention.

Even though the workshop presentations—and the ensuing discussions—were wide-ranging, the primary focus remained on three central issues surrounding the fair and reasonable local rate: (i) the cost of providing residential service, (ii) whether residential service is—or should be—subsidized (and whether the local loop is a shared facility whose cost can be allocated), and (iii) how value of service and affordability considerations affect the fair and reasonable local rate. Significant differences emerged among the participants on all of those issues. This paper follows up an earlier submission in this Special Project[1] by (i) further

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[1] William E. Taylor, *Costing and Pricing Principles for Determining Fair and Reasonable Rates Under Competition*, presented on behalf of BellSouth Telecommunications, Inc., in this Special Project, September 24, 1998. (*"Principles"*)

Determining Fair and Reasonable Rates Under Competition:
Responses to Major Themes at the FPSC Workshop
FPSC Special Project No. 980000A-SP

-2-

clarifying some of the issues on which the sharpest disagreement was observed, and (ii) responding to—and correcting—several viewpoints expressed at the workshops that were wrong or potentially misleading from an economic perspective. In so doing, I hope to provide a clearer economic justification for the FPSC to recommend moderate increases in Florida's current rate for residential service without risking a significant decline in the subscribership rate for that service.

This paper is organized as follows. Instead of responding sequentially to individual presentations at the workshops, I first identify the major themes that drew the greatest amount of debate and discussion during the workshops. Next, I address the disputed issues from the correct economic perspective and suggest the proper course of action for recommending a fair and reasonable local rate. Wherever appropriate, I explain the consequences of not adhering to the correct economic principles when making that recommendation. For convenience, I first summarize my main conclusions from a policy standpoint below.

II. CONCLUSIONS

1. With several non-ILEC parties disputing the existence of subsidies to residential service in the first place, the time has now come to conduct decisive cross-subsidy tests that would establish the true price-cost relationships and help public policymakers chart the future direction of local exchange competition and universal service.

2. To determine whether a multi-service firm's service prices are subsidy-free, it is only necessary to compare those prices with their corresponding TSLRICs. That eliminates any need to know the true SAC of services provided by a multi-service firm which may be impossible to determine accurately.

3. Cost causation explains why the resources used in providing the loop have been expended. The answer is that costs associated with the loop are caused by *a customer gaining access to the network.* That is true whether that access is gained as part of a standard bundled offering like residential service or, in the new environment, by purchasing an unbundled loop. Once the loop is provisioned, the cost has been incurred. The way in which it is *used* (if at all) does not change that cost. Therefore, the cost of the local loop is *not* shared by all the usage services that can be delivered over the loop.

4. The only economically efficient form of pricing is one based squarely on the principle of cost causation. Use *per se,* or the benefit derived from use, is irrelevant to the manner in which cost is caused. Therefore, if public policy is properly designed to recover cost *as*

Determining Fair and Reasonable Rates Under Competition:
Responses to Major Themes at the FPSC Workshop
FPSC Special Project No. 980000A-SP

-3-

it is caused, then the loop's cost should be recovered in the rate for the service of which it is an integral part, namely, residential service.

5. Cross-subsidy should only be measured at the service level, not at the level of a customer that subscribes to and receives several services over a common delivery path. The question here is whether *residential service* in Florida is subsidized, not whether a customer of multiple services provides more in revenue than it costs to serve. Therefore, the "profitable customer" comparison proposed by the FCCA (which compares the aggregate revenue generated by a customer with the aggregate cost to serve that customer) is the wrong cross-subsidy test.

6. The FCCA's profitable customer comparison only masks subsidies to residential service, where they exist, and makes it impossible for the ILEC to compete fairly. Whether the ILEC is a niche provider of the subsidized service (residential service) or faces competition from a niche provider of an unsubsidized service, the FCCA approach would force the ILEC to lose money and exit the market *even when* the ILEC is equally or more efficient than the competitor. That is, the competitor that survives could well be less efficient.

7. Below-cost pricing of residential service was traditionally justified on public policy grounds because of "network externalities" which are the additional value derived for telephone consumers without having to pay for it in the price for residential service and connection to the public switched network. The addition of every customer to the network creates a direct value to the customer that joins but, over and beyond that, increases the value of the network to customers who are *already* subscribing to it. In order to encourage precisely this creation of extra value, public policy has used several means to encourage subscribership growth, including the use of subsidies to residential service.

8. While subscribership has grown impressively since 1920, that growth has been very sluggish ever since the subscribership rate reached 90 percent in 1970. In the last 27 years, subscribership has risen only by 4 percentage points. The reason for slow growth (or stagnation) lately is that the value created by network externalities has fallen as participation in the network has increased. This will make it will get increasingly difficult to induce the subscribership percentage to move toward 100 percent.

9. Attention must be focused on *marginal* subscribers, i.e., those households (not very many in number) whose entry and exit from the network—for whatever reason—constrains the subscribership percentage within a very narrow range around the 94 percent mark. Therefore, the affordability issue—which may be relevant for all customers—is of particular significance to those at the margin.

10. There is strong circumstantial evidence that public policy that provides universal service program support to marginal (low-income) subscribers may be quite effective in raising subscribership while residential service price increases to other customers will have little adverse impact on the overall subscribership rate.

Determining Fair and Reasonable Rates Under Competition:
Responses to Major Themes at the FPSC Workshop
FPSC Special Project No. 980000A-SP

-4-

11. Empirical evidence suggests that the own-price elasticity of demand for the subscriber access component of residential service is typically very close to zero. This suggests that the price charged for such access is itself not at a high level, that subscriber access (and residential service, in general) is a relatively small fraction of the subscriber's overall monthly expenditures, and that there are presently few alternatives to the local loop purchased from the ILEC for gaining network access. In addition, customers derive significant value (i.e., excess of actual benefit over price) from residential service. It is, therefore, important to understand *all* of the reasons for a low price elasticity for local service.

12. There is empirical evidence that the price elasticity of demand for residential service of the most vulnerable income segments, while generally higher, remains in the inelastic range. This signifies that any drop-off from the network due to a moderately higher residential service price would be limited. This is also precisely the population segment for whom targeted universal service support would go a long way to preserve its participation on the network, even as all other customers are asked to pay a higher price for residential service.

A Fair and Reasonable Local Rate: The Major Themes

I.   Introduction

While the workshops produced little disagreement on the *need* for a fair and reasonable rate for residential service in Florida, there appeared to be much greater argument with the *level* at which that rate ought to be set. Generally, the ILECs argued for at least a moderate increase in the rate—Sprint even offered a strawman proposal—while various other parties (including the AARP, OAG, and OPC) argued against any increase. By claiming that existing local rates were already fair and reasonable and a direct cause of Florida's present level of subscribership, the latter parties, in effect, argued that any rate increase was unnecessary. The sharp difference between the parties on whether the level of the rate for residential service in Florida ought to be raised has far-reaching implications for the state's universal service program, the degree and quality of telephone competition in Florida, and the future of enlightened public policy itself.

The major themes or questions to emerge from the workshops are listed below. These are the themes on which the parties differed sharply, and on which future public policy regarding the residential service rate may turn. The significance for public policy of each theme is also listed.

Theme	*Significance*
1. Is knowledge of a service's stand-alone cost ("SAC") truly necessary to test for cross-subsidy?	A properly constructed cross-subsidy test is needed to determine whether or not residential service is subsidized in Florida.
2. Is the local loop a shared facility? Should its cost be allocated among services that are delivered over it?	Answers to these questions determine what the "true" TSLRIC[2] of residential service is and, therefore, whether the rate set for residential service exceeds or falls below that TSLRIC. If the rate is below TSLRIC, residential service is subsidized.

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[2] TSLRIC is a common acronym for total service long run incremental cost. The TSLRIC of a service includes all incremental costs directly attributable to that service plus any fixed costs specific to that service.

n/e/r/a
Consulting Economists

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-6-

Theme (Continued)	*Significance*
3. Should the subsidy test be conducted not by comparing the price and the TSLRIC of residential service but rather by comparing the total cost of and the total revenue from the whole package of services that a customer subscribes to?	It is possible for the subsidy test to yield conflicting results from the two levels of comparisons. Should such a conflict arise, the public policymaker must know which is the proper comparison and what, if any, is the proper course of action. More importantly, the policymaker must know whether and why it is important to remove that subsidy.
4. Could the fact that telephone subscribership does not change much despite a higher residential service rate signify that, in asking for a higher rate, the ILEC is merely taking advantage of a very low price elasticity of demand?	Public policy should permit a higher residential service rate only if that rate remains affordable but, more importantly, removes any cross-subsidy. If subscribership to residential service suffers among the low-income segment of the population, then targeted universal service support should be available to prop up subscribership.

In this paper, I examine each of these four themes in detail. In so doing, I also respond to several erroneous positions and views espoused by representatives of the FCCA, OAG, OPC, and AARP during the workshops.

II. THE PROPER TEST OF CROSS-SUBSIDY

A. Why Is A Test for Cross-Subsidy Needed?

For several years, ILECs in several states (including Florida) have claimed that the residential service rate is subsidized for public policy reasons. If true, that would imply that the price of residential service is below TSLRIC. In addition, that would also mean that one (or more) of the ILEC's services is priced above its SAC in order to provide the subsidy to the residential service rate. While such a public policy may have been sensible—even desirable— in a monopoly environment, there is increasing concern now about the sustainability of subsidies to residential service and even the wisdom of maintaining such subsidies given the push toward industry-wide competition from the Telecommunications Act of 1996. With several non-ILEC parties disputing the existence of subsidies to residential service in the first place, the time has now come to conduct decisive cross-subsidy tests that would establish the

true price-cost relationships and help public policymakers chart the future direction of local exchange competition and universal service.

While there was little disagreement at the recent workshops over the *need* for a fair and reasonable rate for residential service in Florida, parties were predictably split over whether existing residential service rates are already fair and subsidy-free. Some parties (specifically, Mr. Dunkel for the OAG and Dr. Marvin Kahn for the OPC) asserted that, according to their calculations, current rates for residential service in Florida are subsidy-free. Given ILEC claims to the contrary, it is necessary to examine this dispute at greater depth. To keep matters focused, it is useful to start with the question: what is the economically proper test for cross-subsidy?

B.   The SAC is *Not* Necessary to Test for Cross-Subsidy

As I explained in my *Principles* paper, for a multi-service firm, the SAC of a service differs, in general, from the TSLRIC of that service.[3] If the firm uses shared facilities in order to provide that service, the SAC (price ceiling) of the service will exceed the TSLRIC (price floor). Any price that lies in the range between TSLRIC and SAC is subsidy-free and is often considered "fair."[4] In particular, a service that is priced *above* TSLRIC cannot be *receiving* a subsidy, and a service that is priced *below* SAC cannot be *providing* a subsidy. Therefore, in principle, if *all* of the firm's services were priced in the range between their respective SACs and TSLRICs, there would be no question of any cross-subsidization among those services.

While, from a conceptual standpoint, this provides an apparently simple test for cross-subsidy, it is actually impossible to implement correctly. The difficulty lies with obtaining reliable estimates of the SAC for any service that is provided by a *multi-service* firm. By definition, the SAC is the total cost of producing a service on a *stand-alone* basis, i.e., not in combination with any other service. Therefore, when only a single service is involved, there is no need to distinguish between incremental cost, on the one hand, and shared and common

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[3] *Principles*, at 14.

[4] For example, at the workshops, Mr. William Dunkel (representing the OAG) also characterized such a price as "reasonable or fair."

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-8-

costs, on the other. Only when the firm produces two or more services is it even necessary to think of incremental costs for each separately and the costs that are shared by, or are common to, the various services. However, in the latter case of multiple services, determining the SAC of any single service is virtually impossible. Even if the actual chronological order in which the firm produced those services does not matter, the SAC of a service is *not necessarily* the simple sum of its TSLRIC and the firm's shared and common costs. There are two reasons for this. First, not all of the shared costs may arise when a particular service is produced; instead, those costs may be shared by the firm's remaining services.[5] Second, and more importantly, the way a firm builds its production facilities when it produces only one service may be quite different from the way it builds those facilities when it produces that same service *in combination with* several other services. A carrier that only provides long distance service may build quite a different network from one that provides long distance service along with several other services. Therefore, the SAC of long distance service that is "derived" from the multi-service carrier's cost information may be quite different from the true SAC, namely, the cost of the long distance-only carrier.

Fortunately, there is a way out of this conundrum. As I pointed out in my *Principles* paper, a well-established result in economics states that, for a multi-service firm that breaks even (total revenues equal total costs), the price of every service provided is subsidy-free as long as that price is equal to or greater than the service's TSLRIC.[6] This comports with the broader rule (discussed above) that a service whose price is no lower than its TSLRIC does not *receive* a subsidy. In other words, to determine whether a multi-service firm's service prices are subsidy-free, it is only necessary to compare those prices with their corresponding

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[5] Recall that a shared cost is a cost that is shared by two or more—*but less than all*—of a firm's services and is specific to none of those services. Thus, a cost that is shared only by services *A* and *B* does not affect the SAC of a third service *C*.

[6] *Principles*, at 15. Also, note the explanation for this result using the example of a firm that provides two services, local and toll. As I explain later in this paper, this rule continues to apply even when the firm's total revenue exceeds its total cost.

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-9-

TSLRICs. That eliminates any need to determine the true SAC of services provided by a multi-service firm.[7]

C.   Cross-Subsidy Tests Proposed by the OAG and OPC are Unnecessary and Incorrect as Conducted

At the workshops, both Dr. Kahn (for the OAG) and Mr. Dunkel (for the OPC) claimed that the only proper test for cross-subsidy is one that first determines both the SAC and the TSLRIC of every ILEC service and then examines whether the current price of each service lies within the range between SAC and TSLRIC. Dr. Kahn went further by asserting that, while a test that focuses only on TSLRIC might be correct *in theory*, it is not a "satisfactory test" of cross-subsidy *in practice*.[8] If I understand his logic correctly, Dr. Kahn appears to believe that SACs can be determined without much dispute or difficulty and that TSLRICs can then be determined residually from the firm's total cost. To explain this, Dr. Kahn even presented a chart that showed how, given the total cost of providing two services X and Y, the TSLRIC of X could be found by subtracting the SAC of Y from the total cost and, similarly, the TSLRIC of Y could be found by subtracting the SAC of X from the total cost. Dr. Kahn explained further that this method of residually determining TSLRICs once the SACs were known is less arbitrary than the method which requires direct determination of the TSLRICs and introduces, in his opinion, a form of analyst subjectivity or bias into that determination. Therefore, Dr. Kahn concluded, a subsidy test that depended on TSLRICs alone would be inferior to one that used both SAC and residually-determined TSLRIC information.

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[7] This test of cross-subsidy is widely accepted among economists. In the words of Professor William J. Baumol, one of this test's strongest advocates:

> When this concept has been proposed before regulatory agencies some concern has been expressed about problems in the calculation of stand alone cost. After all, if no firm in an industry has ever specialized in the production of just one of its outputs, let alone served one of its customers in isolation, how can one hope to obtain any reliable estimate of the cost that would be incurred in this unlikely situation? As it turns out, no such calculation is necessary if it can be shown that every customer group is paying at least its incremental cost, and the firm as a whole is earning no more than the cost of its capital, i.e., no more than a normal profit.

William J. Baumol, *Superfairness: Applications and Theory*, Cambridge, MA: MIT Press, 1986, at 122.

[8] Transcript of FPSC Staff Workshop, October 8, 1998, at 92.

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-10-

I disagree with both Dr. Kahn and Mr. Dunkel on this issue for the following reasons:

1. I do not share Dr. Kahn's optimism that SACs can be determined without any dispute. In fact, as I remarked earlier, true SACs may be impossible to determine for multi-service ILECs because the networks they build to provide any one among their several services on a *stand-alone basis* may be quite different from those they presently have in place. The SAC of, say, Call Waiting by itself when calculated correctly (i.e., from a stand-alone network designed and optimized *only* for Call Waiting—provided that is at all possible) can be very different from the SAC that is "backed out" for Call Waiting from data on a full-fledged multi-service LEC network.

2. Dr. Kahn's concern about an analyst bias in direct estimates of TSLRIC is a red herring. Any effort to model cost—be it TSLRIC or SAC or some other—is bound to involve some uncertainty and incomplete information. That is the nature of all quantitative models that try to convert large amounts of complex and detailed information into simple or single-valued measures or indices. However, that does not mean that carefully designed models based on plausible and widely-accepted assumptions and inputs cannot produce reasonable approximations to the truth. There is now a substantial record of estimating incremental cost in the telecommunications industry, for local exchange and other types of services. On the other hand, there is a very *scant* record of estimating SACs for the services of multi-service ILECs. Dr. Kahn's claim of having estimated costs that were allegedly SAC in a 1987 proceeding[9] before this Commission begs the question: *did he do so correctly?*

3. The fact is Dr. Kahn got it wrong in 1987, a matter that was also noted and criticized by an economist for AT&T.[10] In a nutshell, Dr. Kahn moved the cost of the local loop out of the direct incremental cost of local exchange service—where it rightly belongs on grounds of cost causation—to the amorphous "shared and common" category. This arbitrary exercise in cost-shifting enabled Dr. Kahn to produce over-estimated SACs and under-estimated incremental costs which, in turn, produced a range of subsidy-free prices that was conveniently wide enough to accommodate the then prevailing local service rate.[11] Clearly, Dr. Kahn's methodology for determining the SAC of local service was not then—and still isn't—free of analyst bias. It is also not inconceivable that that methodology was designed to deliver precisely the desired outcome, namely, a finding that the residential service rate in Florida is subsidy-free. Therefore, simply having done it before is no justification for repeating an erroneous exercise.

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[9] Florida Public Service Commission, *In Re: Investigation into NTS Cost Recovery, Phase I*, Docket No. 860984-TP, 1987.

[10] Rebuttal testimony by Dr. John W. Mayo, before the Florida Public Service Commission, *In Re: Investigation into NTS Cost Recovery, Phase I*, Docket No. 860984-TP, June 1, 1987

[11] Compounding this error was Dr. Kahn's use of arbitrarily allocated embedded accounting—not economic—costs, a feature also noted by Dr. Mayo in his rebuttal testimony (at 12).

n/e/r/a
Consulting Economists

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-11-

4. Perhaps the greatest virtue of the test for cross-subsidy based on TSLRICs only is that it is *mathematically equivalent* to the test that uses both SACs and TSLRICs, while it does not involve the highly contentious process of determining the SACs. This virtue appeared to be lost on Mr. Dunkel who claimed during questioning that it is possible for all services to be priced at or above TSLRIC and still have at least one service priced above SAC as well.[12] In that case, the service in question would be *providing* a subsidy. To ensure that this does not happen, Mr. Dunkel insisted that SACs would have to be known. This argument is logically flawed for the following reasons:

- First, Mr. Dunkel's contrived example is mathematically impossible. Suppose there are three services, two of which are priced at TSLRIC. The total cost of the firm must then be the sum of the three service TSLRICs and the shared and common costs. A firm that breaks even must recover that sum of costs. Now, if two services recover exactly their TSLRICs, then the third service would recover *at most* its own TSLRIC and the shared and common cost. But that is exactly what Mr. Dunkel calls the SAC of the third service, no more or no less. Therefore, it is impossible for any service to be priced above SAC if the other services are recovering at least their TSLRICs.

- Second, what if the firm is *more* than breaking even? In that case, it is possible in *theory* that the third service would be priced above its SAC. But, that is not germane to the question here, namely, is at least one service (residential service) *receiving* a subsidy, i.e., being priced below TSLRIC? Now, if all services are recovering at least their TSLRICs, then *no* service can be receiving a subsidy. Therefore, it is of no importance whatsoever that the firm may be positioned to *provide* a subsidy by pricing at least one service above SAC. If a subsidy is not received, then it is irrelevant whether—in theory—a subsidy could be provided. More importantly, pricing above SAC for its own sake is not even sustainable in competitive markets. Any equally-efficient entrant could provide the same service at least at the TSLRIC and, if that's the only service it provides, at most at the SAC. Thus, the competitor would always provide a better price than the incumbent that tries to price above SAC—a point Mr. Dunkel himself appeared to acknowledge.[13]

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[12] Transcript of FPSC Staff Workshop, October 1, 1998, at 196-197.

[13] "No one in a free market would pay more than stand-alone because they would simply not share anymore; they would build their own system." Transcript of FPSC Staff Workshop, October 1, 1998, at 160.

n/e/r/a
Consulting Economists

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-12-

III. THE LOCAL LOOP IS NOT A SHARED FACILITY AND ITS COST CANNOT BE ALLOCATED

A. Cost Causation Warrants Treating Loop Cost as Part of the TSLRIC of Residential Basic Local Telecommunications Service

The central issue during the workshops was the economically correct treatment of the cost of the local loop. Parties at the workshop were predictably divided on whether that cost belongs in the category of "shared and common costs" of the ILEC—a position held by the OAG, the OPC, and the AARP—and, hence, in the SACs of various services that use the loop, or entirely in the TSLRIC of residential service—a position held by the ILECs. For example, when asked whether this difference of views appeared to drive the entire debate about whether or not residential service in Florida is a subsidized service, Mr. Dunkel responded: "That is certainly the major difference."[14] While this, in itself, was not a surprising outcome, what was somewhat unexpected was the reliance upon the principle of cost causation by *both* sides to justify their respective points of view.

As I explained in my *Principles* paper,

> Cost causation provides the answer to the question why the resources used in providing the loop have been expended. The answer is simple: the costs associated with the loop are caused by *a customer gaining access to the network*. That is true whether that access is gained as part of a standard bundled offering like [residential service] or, in the new environment, by purchasing an unbundled loop. Once the loop is provisioned, the cost has been incurred. The way in which it is *used* (if at all) does not change that cost.[15]

The subtle point here is that the cost of a facility arises *entirely* at the point it is placed in service, not in a distributed manner over time as that facility is put to several different uses. Use *per se*, or the benefit derived from use, is irrelevant to the manner in which cost is caused. Therefore, if public policy believes in recovering cost *as it is caused*, then the loop's cost should be recovered in the rate for the service of which it is an integral part, namely, residential service. On the other hand, if public policy believes in recovering cost *in proportion to use* or

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[14] Transcript of FPSC Staff Workshop, October 1, 1998, at 200.

[15] *Principles*, at 28.

n/e/r/a

Consulting Economists

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-13-

value generated by use, then the loop's cost could conceivably be recovered in the rates of all the services that are delivered over the loop.[16] While the latter form of cost recovery is certainly *one* public policy choice—and one practiced in certain quarters—it, however, does *not* derive its legitimacy from the cost causation principle itself. Such a practice results in prices that do *not* reflect cost. The only economically efficient form of pricing, in contrast, is one based squarely on cost causation.

B.   The OPC's Application of the Cost Causation Principle to the Cost of the Local Loop is Incorrect

The presentation by Mr. Dunkel (for the OPC) at the workshops most clearly demonstrates how a fundamental economic principle like cost causation can be misapplied. After having championed the cost causation principle himself, Mr. Dunkel proceeded to make the following claim:

> If the [I]LECs did not provide basic exchange service, while continuing to provide toll, switched access, and other services, the [I]LECs would still need a facility to connect traffic to and from the premises (a loop). Since the loop would still be needed even if the companies did not provide basic exchange service, the loop cost obviously is not caused by basic exchange service. Basic exchange, toll, switched access, and many other services are part of the family of services that causes the loop cost, but no one of those services, by itself, causes the loop cost.[17]

This is an extraordinary demonstration of Mr. Dunkel's failure to both understand how the cost causation principle should be applied *and* learn from a real life example in the history of telecommunications in the U.S.

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[16] This position was most clearly articulated at the workshops by Dr. Cooper on behalf of the AARP. Unfortunately, for all its directness, this position is bereft of the economic foundation provided by the principle of pricing in accordance with cost causation. In my *Principles* paper, I cited two papers—around which a broad consensus has emerged among economists—that identify in exhaustive detail the perils and meaningless (even absurd) outcomes from failing to price services in a cost-causative manner. The two papers are: Alfred E. Kahn and William B. Shew, "Current Issues in Telecommunications: Pricing," *Yale Journal on Regulation*, 4, 1987, at 191-256, and S.G. Parsons, "Seven Years After Kahn and Shew: Lingering Myths on Costs and Pricing Telephone Service," *Yale Journal on Regulation*, 11, 1994, at 149-170.

[17] William Dunkel and Tom Regan, Outline of Presentation at FPSC Staff Workshop, October 1, 1998, at 6. (emphasis in original)

-14-

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

First, the cost causation principle starts by asking who or what the cost-causer is. This requires identifying the specific action or decision that leads directly to the expenditure of resources that, in turn, results in a cost being incurred. Economists generally agree that the cost of the local loop is caused when a customer asks for local exchange service, of which subscriber access to the public switched network *is an integral part*. Even today, there is no alternative to local exchange service (like residential service) for receiving such two-ways wireline access to the network. The customer's decision to seek such access is important at two levels: (i) access *precedes* any actual usage and is, therefore, separate from it, and (ii) that decision to seek access *is* the cost-causing action. In other words, access is a service that can be demanded in its own right by the customer, regardless of any or all *uses* to which he or she may wish to put such access. There is a separate rate and a separately identifiable demand elasticity for that access service. Furthermore, it is the *customer's* decision to seek access that drives the cost of the loop. It is *not*, as Mr. Dunkel appears to suggest, a *carrier's* role as the supplier of the loop that drives that cost. The source of *demand* is the cost-causer and should pay for the cost it generates. The *supplier*, on the other hand, that meets that demand needs to be compensated for having provided the service. Mr. Dunkel clearly confuses the supplier (the ILEC) with the cost-causer. As a result, his entire subsequent application of the cost causation principle goes hopelessly astray.

Second, Mr. Dunkel's hypothetical example of the ILEC that drops local exchange service but continues to provide all other services contrives a situation that wasn't even true the only time in U.S. telecommunications history something resembling the circumstances in his example happened. At divestiture in 1984, the old AT&T shed all of its local exchange operations (and other incidental services) while retaining only interstate toll service. Indeed, it *did* avoid the cost of loops in that the Bell Operating Companies that were created assumed all of those costs. With no further need to recover the substantial loop costs in its toll service, AT&T was able to reduce its toll prices significantly and was required to pay only the usage-related *carrier* (not fixed subscriber) access charges. This is evidence that AT&T did "avoid" the cost of loops in the sense it no longer *provided* the loop facility when customers sought subscriber access. Instead, customers now combined services from two distinct sources: loops from ILECs and toll service from AT&T and other IXCs. For the privilege of using the ILEC-

provided loops to deliver their toll service, the IXCs only paid carrier access charges. The IXCs certainly retained the *option* to provide subscriber access (loops) themselves but, in light of the obvious economics involved, chose instead to use ILEC-provided loops—for a usage-related charge—to deliver their toll service.[18] Again, this example demonstrates why Mr. Dunkel's scenario is so contrived (despite his appeal to the cost causation principle): he simply confuses the service provider with the cost-causer.

Another manifestation of that confusion can be seen in a "finding" Mr. Dunkel attributed in his presentation to the Washington Utilities and Transportation Commission—that an ILEC that ceases residential service would only avoid the cost of local *usage* and some other small miscellaneous costs.[19] The Washington Commission's conclusion is premised on a fundamentally incorrect view of what would happen if an ILEC were to cease providing local exchange service in its totality. With the withdrawal of that service, the ILEC's customers would lose subscriber access (i.e., the loop) as well, not just local usage as the Washington Commission seems to believe. Unless the ILEC were to explicitly *unbundle* its subscriber access (loop) service from its usage services, there could be no way for it to withdraw its local exchange service and avoid only the cost associated with the usage services. The Washington Commission's view is clearly flawed and, not surprisingly, not shared widely.

C.   The Local Loop Cost is *Not* Shared by All Usage Services That Can Be Delivered Over the Loop

It would seem fairly straightforward to go from a proper application of the cost causation principle to the conclusion that the cost of the loop or subscriber access is, in present circumstances, contained entirely within the cost of residential service. However, the OPC's and AARP's flawed application of that principle leads directly—and not surprisingly—to the erroneous conclusion that the cost of the loop is at least shared by, and possibly even common to, all the services that could be delivered over the loop. As I have remarked before, this would

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[18] In fact, the IXCs *have* provided their own loops on occasion to serve high-volume (generally, business) customers in order to avoid paying access charges. Their private line services are based on special access bypass.

[19] William Dunkel and Tom Regan, Outline of Presentation at FPSC Staff Workshop, October 1, 1998, at 4.

-16-

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

even include the services of the local pizza parlor to which I could convey my dinner order by simply using my telephone.[20] Now, if we should follow Mr. Dunkel's and Dr. Cooper's suggestion and recover the cost of the loop from all such services, then surely we should make every effort to recover the appropriate share of the cost from the pizza parlor as well! As absurd as this may sound, there are several other bizarre consequences of that Dunkel-Cooper suggestion. I discuss some of those consequences below.

1. Claim: "Loop costs are caused by the whole family of services they are installed for, not just by basic exchange service."

This claim was articulated by Mr. Dunkel in his workshop presentation and parallels Dr. Cooper's own statement on the matter.[21] To consider why it simply cannot be true, consider the example of two customers, say, Jack and Jill. Jack makes only local calls while Jill makes use of all possible services available. If Jack had a line installed for the sole purpose of making local calls, then the loop cost ought to figure entirely in the cost of his local service. On the other hand, following the logic of this claim, Jill's loop cost would have to be distributed across the various services she uses. Assuming that all customers are located somewhere on the spectrum between Jack's usage and Jill's usage, loop costs would be recovered differently from each customer as long as they all have different usage mixes. That is nothing short of an accounting nightmare! Moreover, if such a practice were defended by an appeal to "cost causation" then clearly the manner in which loop cost is caused would appear to be different for each customer. Even resorting to some fictional "average" mix of usage for distributing loop cost would be arbitrary, meaningless, and economically inefficient. That is because for Jack (who only makes local calls), the price of local service—based on this average usage procedure—would be lower than what it ought to be, thus encouraging over-consumption of local service. In contrast, for Jill (who uses every service), the price of any given service would be "too high" if her usage of that service were below the average usage or "too low" if her

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[20] Transcript of FPSC Staff Workshop, October 9, 1998, at 275-276.

[21] William Dunkel and Tom Regan, Outline of Presentation at FPSC Staff Workshop, October 1, 1998, at 6. Mark N. Cooper, "Preserving Just, Reasonable and Affordable Basic Service Rates," presentation handout, FPSC Staff Workshop, October 8, 1998.

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-17-

usage of that service were above the average usage. In either case, consumption of services would be artificially distorted and resources would be allocated inefficiently.

In contrast, to this highly garbled scenario, the assignment of loop costs uniquely to local exchange service creates none of the confusion. Whether the customer is Jack or Jill or someone in between, they all pay the same price for local service and prices for other services based purely on their respective incremental costs.

> 2. **Claim: A loop is "built to collect revenues from all of the services that will be provided over that loop, not just to collect the revenues from one of the services that will be provided over that facility."**

This claim, too, was made by Mr. Dunkel during his presentation.[22] Contrary to Mr. Dunkel's belief, however, the loop is *not* a device for measuring usage or billing. This claim appears to assume that the provider of the loop expects to provide *all* of the services that the customer may want. That leaves no room at all for niche providers of service (such as those that specialize in specific services, say, internet-based services or other discretionary-use services). Even though a customer may use the same loop to receive many different services, it is still economically efficient to price *every* service delivered over the loop according to *its* economic cost. If one or more of those services is subsidizing any one service in the mix, then that rule is not satisfied and niche providers can take advantage of the situation. Of course, when aggregate revenues from an access line are compared to aggregate costs, such a subsidy situation may well be masked. But, such a comparison is completely wrong: the customer may not be subsidizing himself or herself in the *aggregate*, but one or more of the *services* that that customer subscribes to may be subsidizing another service he or she is taking.

> 3. **Claim: "Proper cost recovery is to spread the loop cost over the services which share that facility."**

This claim, made by Mr. Dunkel in his presentation,[23] gets us down the slippery slope of having to (i) estimate the share that each service could carry, (ii) use arbitrary allocators that

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[22] William Dunkel and Tom Regan, Outline of Presentation at FPSC Staff Workshop, October 1, 1998, at 6.

[23] *Id.*, at 7.

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-18-

have no economic justification (e.g., should a non-usage-sensitive cost be recovered through usage-sensitive charges?), and (iii) spread recovery across not merely different services but across different *service providers* as well. None of these actions have any economic validity as I argue below.

First, consider what would happen if each service that *could be* carried over the loop were to be assigned its share of the cost to recover. As with the Jack and Jill example earlier, variations in usage patterns among customers would inevitably compel us to work with averages instead. This would require us to estimate average usage *levels* of all services and, hence, the corresponding average usage *shares*. In practical terms, because usage services are measured in different physical units (e.g., minutes and calls), any average would have to be measured in terms of dollars and cents. However, even that may not be quite so simple because several usage services are purchased on flat-rated plans that remove the ability to measure actual usage (e.g., fixed monthly charges unrelated to actual usage for local usage, certain vertical services, or internet service). Assuming that average revenue shares for all services can somehow be determined, the next step would be to assess additional charges on those services in the same proportions as the average usage shares, even though those services do not generate loop costs in the same proportions. After all this, however, three problems would remain.

1. Those charges would have to be adjusted periodically (every month? year?) as the average usage shares themselves changed.

2. Changing relative prices of the services could change the average *revenue* shares themselves even without any change in the underlying average usage measured in physical units. Therefore, some kind of complicated index would have to be used instead.

3. As I explained earlier, customers with usage patterns different from the average would end up either subsidizing other customers or being subsidized. This would, in turn, be accompanied by distortions in the economically efficient levels of consumption of the services.

Second, the use of arbitrary allocators would mark a return to the discredited practice of using fully distributed costs to set prices. Basic questions like "should non-usage-sensitive loop or facility costs be recovered through usage-based charges?" will re-surface. At the interstate level, the FCC has already moved to replace some past pricing anomalies (like minutes-based

*Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP*

-19-

carrier common line charges for carrier access) with more appropriate fixed line charges. As the exchange between Mr. Dunkel and Commissioner Deason during the workshops showed, there are theoretical and practical reasons for not resorting to arbitrary minutes-based allocators of the loop cost.[24] In addition, there is little economic justification for the equal-shares allocation mechanism proposed by Mr. Dunkel.[25] Such an allocation is no more or less arbitrary than one which relies on minutes of use; in fact, any allocation not based on cost causation would be arbitrary and, therefore, without any economic basis. As I remarked at the workshop, loop costs should never be allocated.[26] Such an allocation would not be consistent with cost causation and would, in fact, create precisely the cross-subsidies that we all have an interest in eliminating. While costs that are *truly* of the shared and common variety should be recovered in the rates of various services, market demand conditions—not arbitrary allocators—should be the mechanism by which carriers recover those costs.[27]

Third, the allocation approach quickly gets us into obviously untenable scenarios such as the one that surfaced when Mr. Dunkel, responding to Commissioner Deason's question, proposed that different service providers (ILECs, IXCs, and other competitors) be required to work out some kind of burden sharing arrangement.[28] Apart from the fact that such an arrangement could not be enforced without the use of substantially *more* regulatory (and possibly legislative) heft, it is also an infeasible and unrealistic prospect under market competition where service providers of different stripes have no economic incentive to cooperate (on burden sharing or anything else) whatsoever. Mr. Dunkel's convoluted example of two businesses that share a common parking lot is absolutely unconvincing. Outside of network industries, openly competitive businesses have no economic incentive in sharing costs, much less in splitting them equally. As a result, duplication of facilities like parking lots is commonplace. A more likely outcome is one in which different businesses (whether competing

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[24] Transcript of FPSC Staff Workshop, October 1, 1998, at 221-226.

[25] *Id.*, at 225.

[26] Transcript of FPSC Staff Workshop, October 9, 1998, at 270.

[27] See *Principles*, at 35-40.

[28] Transcript of FPSC Staff Workshop, October 1, 1998, at 229-231.

or not) lease premises in an office park which has a large enough parking lot to serve *all* users of those premises. Generally, businesses large enough to have sufficient usage will build parking lots that only they would use.

4.   Claim: The loop cost is similar to the cost of magazines or newspapers because both readers and advertisers use the "facilities" and, therefore, support cost recovery jointly.

Mr. Dunkel argued at the workshop that readers (who may be likened to end-users) and advertisers (similar to IXCs) both contribute to the recovery of newspaper costs.[29] Therefore, in his view, loop costs resemble the cost of newspapers. In reality, however, it is highly improbable that newspaper readers purchase newspapers for the sole purpose of reading advertisements. While those readers may have the *option* to read ads, they avoid the entire cost of the newspaper if they don't wish to read the news, just as a telephone customer avoids the entire cost of the loop if he or she doesn't want local service. In any event, the retail telephone customer pays for *all* of his or her use of telephone facilities (whether to receive local, toll, or other services). He or she does not share the cost of those facilities with service providers like IXCs. For this reason, Mr. Dunkel ought to view advertisers as end-users themselves who use newspaper facilities to receive service as well (get their advertisements printed). Mr. Dunkel's analogy between advertisers and IXCs is, therefore, wrong.

To the extent that the printing of advertisements renders a service for advertisers and generates a cost over and beyond that associated with merely printing the news, the advertisers act as end-users and, therefore, help to defray that cost. However, the fact that readers of the news sections (i.e., the portion of the newspaper which they pay to purchase) derive some *value* from the advertisements does not necessarily mean that they are cost-causers and should pay for the advertisements. Each group (news readers and advertisers) should be responsible to pay for the incremental costs that they cause. If the newspaper company, however, decides to make advertisers pay *more* than the incremental cost of advertisements in order to let news readers purchase newspapers for *less* than the incremental cost of the news sections, then that is overtly a policy followed by the newspaper company to cross-subsidize news readers by advertisers.

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[29] William Dunkel and Tom Regan, Outline of Presentation at FPSC Staff Workshop, October 1, 1998, at 7.

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-21-

That policy is only sustainable as long as the newspaper company prints both news and advertisements. In the telecommunications context, where local exchange and toll services are available from different service providers, such cross-subsidization could only be enforced (as it has been historically) by regulation but would not be sustainable under competition.

> **5.** **Claim: A restaurant recovers its rent costs from all of its products whether or not they are all purchased by every customer; similarly loop costs should be recoverable from all services even if not all are purchased by any given customer.**

This is another of Mr. Dunkel's spurious analogies.[30] Restaurant customers all pay for the rent, regardless of the food items they actually buy, because the rent for the restaurant premises is a true common cost. It would not be avoided by discontinuing one or the other food item, but would only be avoided by discontinuing the restaurant operation altogether. For all the reasons I have explained, the loop cost is not a common cost. The cost of the loop *would* be avoided by discontinuing residential service. Mr. Dunkel claims that "almost everyone receives toll calls which is using the loop for toll service." He infers that is sufficient grounds for requiring toll service to recover some part of the loop cost. Again, this reasoning misses the point about cost causation. If a customer were to use an outgoing-only line to avoid *receiving* calls, the loop cost would still *not* be avoided. Instead, that cost would only be avoided by discontinuing residential service.

IV. RESIDENTIAL SERVICE *IS* SUBSIDIZED

A. The FCCA's Finding of No Subsidy to Residential Service Uses the Wrong Comparison

Testing for cross-subsidy is—at least at the conceptual level—a fairly straightforward exercise. It is customary to speak of (the customers of) a *service* being either subsidized or not by (the customers of) another *service*. The applicable test of whether a service is receiving a cross-subsidy, therefore, involves its incremental cost (TSLRIC) and its price. It does *not*

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[30] *Id.*

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-22-

matter that the service being so tested is one among several that a firm may provide or a customer may purchase. Therefore, it is of no concern to a properly conducted test of cross-subsidy whether the _aggregate_ revenue earned by a firm from sale of all its services is enough to cover that firm's _aggregate_ cost of providing those services. It is also of no concern to that test whether the revenue earned from a particular customer's (or customer group's) _aggregate_ purchases is enough to cover the cost of providing all the services purchased by that customer (or customer group).

At the workshop, Mr. Gillan (of the FCCA) readily conceded that loop cost allocation (as sought by the OAG, OPC, and AARP) is a meaningless and arbitrary exercise.[31] However, he then went on to argue that to determine whether or not residential service is subsidized in Florida, it is only necessary to compare the total revenue earned from a customer that receives various kinds of telephone services over the subscriber access line (local loop) with the total cost of serving that customer. Mr. Gillan's "profitable customer" test is, therefore, proposed as the correct (or, in Mr. Gillan's words, "rational") test of cross-subsidy for residential service in Florida. From an economic perspective, this is the wrong comparison for the following reasons.

1. Cross-subsidy should only be measured at the service level, not at the level of a customer that subscribes to and receives several services over a common delivery path. The question here is whether _residential service_ in Florida is subsidized, not whether a customer of multiple services provides more in revenue than the costs to serve that customer.

2. FCCA's profitable customer comparison takes for granted that the various services that a customer receives over the access line are all purchased from the _same_ service provider. When this assumption is false, the profitable customer comparison provides a totally misleading test of cross-subsidy, as is illustrated below.

   While one-stop-shopping may be a business objective of competing carriers (and service bundles the primary means by which they compete), there is absolutely no guarantee that customers will take all their services from the same service provider. In fact, the point of customer _choice_ is that a customer may shop around for the best price-quality combination from among alternative suppliers and select different suppliers for different

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[31] Transcript of FPSC Staff Workshop, October 9, 1998, at 315.

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Consulting Economists

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-23-

services if such a strategy delivers the greatest value. The significance can be explained with a simple *hypothetical* example:

Suppose a customer receives three services over his access line: local usage, toll usage, and call waiting. Suppose local access and usage are available as part of residential service for which the customer pays $15 per month. In addition, he makes 60 minutes of toll calls a month at 15¢ per minute and uses a vertical service for a flat $4 per month. Also, suppose that it costs $20 per month to provide residential service, 5¢ per minute to provide toll, and $1 per month to provide the vertical service. Under these assumptions, the customer generates $15+$9+$4 = $28 in aggregate revenue per month, while it costs only $20+$3+$1 = $24 in the aggregate to serve. Under the FCCA's profitable customer comparison, this customer generates a $28-$24 = $4 profit per month and, therefore, does not receive a subsidy.

Now, suppose that the customer receives only residential service from the ILEC that provides his access line while the toll and vertical services are delivered over the same access line by a competing carrier. Under the same prices, costs, and usage, the competitor generates $9+$4 = $13 per month in revenue and incurs $3+$1 = $4 per month in cost. That is, the competing carrier makes a $13-$4 = $9 per month profit from the customer. However, the ILEC only makes a revenue of $15 against a $20 cost, for a monthly *loss* of $5. Without a subsidy of the same amount, the ILEC could not possibly continue to provide residential service to the customer.

These contrasting scenarios demonstrate quite simply the central point in the test for cross-subsidy. If that test is not conducted at the service level, i.e., if the FCCA's proposed test is used, the existence of any cross-subsidy may well be masked. Further, if the customer receives services from different providers then, under the FCCA test, the subsidy to residential service will not be detected and, most likely, not compensated out of a universal service high cost support fund. The only way the ILEC would be fully compensated is if it were the sole provider of services to the customer. Under competition, there is no such guarantee.

3. There are two situations, in particular, in which inefficient competition could result from using the FCCA's proposed test for cross-subsidy.

    ●   Suppose the ILEC only provides residential service, but a competitor provides all three services. Next, assume that the competitor's cost to provide residential service is $22 per month (to the ILEC's $20). Whereas the ILEC would need $5 in monthly subsidy, the competitor would need $7. However, because the competitor also provides the other services—which are sufficiently profitable—it is able to not only recover its loss from residential service but, in fact, turn a $2 per month profit from serving all of the customer's needs. The FCCA would argue that this is as it should be because, under competition, *all* service providers would be all things to all customers. It is hard to imagine that, in the real world, competition happens this way.

- Now, suppose the ILEC provides all three services but faces competition from another provider of toll service. The latter carrier is a *niche* competitor and specializes only in one service. Assume it costs that competitor the same as the ILEC to provide toll service (namely, 5¢ per minute). However, noting that the ILEC charges 15¢ for a minute of toll, the niche competitor decides to charge only 6¢ per minute.[32] At that rate, the competitor can still make a profit from toll service, albeit a slim one. Next, observe how the ILEC may be affected. Fearing desertion by the customer—at least for toll service—the ILEC is forced to reduce its toll rate to 6¢ per minute as well. Keeping matters simple by assuming no demand stimulation, at the new toll rate the ILEC can only earn $3.60 per month in toll revenue and $15+$3.60+$4 = $22.60 in aggregate revenue from the customer. That monthly take is now $1.40 *below* the ILEC's total cost to serve the customer. The resulting loss puts the ILEC in an untenable position. Observe that this results from the simple fact of competition from an equally-efficient niche competitor for an *un*subsidized service. Also, the ILEC cannot escape this predicament by not providing the other unsubsidized service—the vertical service; in fact, dropping that service would only make matters worse.

The lesson is clear. Adopting the FCCA's proposed profitable customer comparison would only mask subsidies to residential service, where they exist, and make it impossible for the ILEC to compete fairly. Whether the ILEC is a niche provider of the subsidized service (residential service) or faces competition from a niche provider of an unsubsidized service, the FCCA approach would force the ILEC to lose money and exit the market. In particular, that exit could happen *even when* the ILEC is equally or more efficient than the competitor. That is, the competitor that survives could well be less efficient.

B.   The OAG Falsely Claims that Local Service Cannot be Subsidized Because "Expected Actions" are Supposedly Inconsistent with "Market Observations"

At the workshop, Dr. Kahn (for the OAG) dismissed the possibility of a subsidized residential service thus:

> What I'd like to do here is to follow through with some of the implications of an argument being made [here] ... that the current pricing of the local loop and local service is below cost and that is inconsistent with the workings of a competitive market. ... And what I'd like to do is run through a couple of the expected actions that we would anticipate seeing in the marketplace if that statement were

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[32] This example of "cream-skimming" reflects what happens in the real world when prices of ILEC services are misaligned with costs (generally because those services are set up to provide implicit subsidies to residential service).

absolutely correct, and compare it to what some of the actions are that we do see in the marketplace that I think you'll see are really quite different.[33]

I discuss below some of Dr. Kahn's claims in this regard and why they are simply not tenable.

1. **Claim: If residential service is subsidized, then rate rebalancing in competitive markets would align all service prices with their costs; yet, service packages and one-stop-shopping efforts are becoming commonplace.**

Dr. Kahn claimed that if residential service is subsidized then rate rebalancing could be expected to occur in competitive markets. Yet, he observed, service packages and one-stop-shopping indicate that most costs are shared and that FCCA-style price-cost comparisons only at the customer—not the individual service—level alone appear to be relevant to service providers.

This issue is a red herring. First, rate rebalancing is precisely what this FPSC Special Project and others like it around the country are all about. That is, even though the conditions favor it, rate rebalancing still cannot happen all by itself. Second, service packages and actual instances of one-stop-shopping are too few to call them a market reality. Third, as I explained earlier, even if one-stop-shopping were to become the norm rather than the exception, subsidized residential service could *still* be a problem for service providers that do not necessarily supply *all* services. Dr Kahn's view, like Mr. Gillan's, is that all competitors would offer the full slate of services, thus leaving no room for niche providers. In order that niche providers of a subsidized service be able to compete fairly with service packagers, or that providers of subsidized services be able to compete against niche providers of unsubsidized services, it is essential that no service—by itself or in packages—be sold at a subsidized price.

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[33] Transcript of FPSC Staff Workshop, October 8, 1998, at 93-94.

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-26-

2.   **Claim: Despite claims that local exchange entry would not happen without rate rebalancing, "intense" local competition is emerging in California and Nebraska, among other states.**

Dr. Kahn claimed that even though competitive market entry could not be expected until local rates were rebalanced, he has already observed competitive entry in California and Nebraska. In fact, California has already experienced at least some rate rebalancing and the emergence of competition there is not surprising. For the overwhelming majority of states that have not yet rebalanced rates, this claim simply does not square with the reality that there is still little local residential entry of any consequence.

3.   **Claim: The FCC's choice of a revenue benchmark for sizing the proposed federal universal service fund does not reflect any concern with subsidized residential service.**

Dr. Kahn's final claim about how expected action diverges from market observation (about the FCC's choice of a revenue benchmark for universal service) makes no sense whatsoever. An FCC action about where to set the benchmark is certainly not a "market outcome," and, as the present state of the debate around sizing the universal service fund shows, the FCC's choice of benchmark is far from controversial or universally accepted. Worse still, it is not based on any economic principle and is a feeble attempt to avoid dealing with the impossibility of cost allocation.

V.   SENSITIVITY OF TELEPHONE SUBSCRIBERSHIP TO SERVICE PRICE

A.   Achieving the Public Policy Goal for Telephone Subscribership

Participants at the workshop were all agreed that the long-standing public policy of maximizing subscribership to the public switched telephone network should remain the guiding principle in any adjustment of the price of residential service in Florida. Indeed, one of the central themes of the workshop was that residential service should remain "affordable," and that any increase in the price of residential service needed to reduce or eliminate the current subsidy flowing to that service should not be permitted at the expense of affordability.

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-27-

With the presentation of several widely-varying views on affordability at the workshop, the Commission's particular interest seemed clearly to be in the issue of how pricing residential service affects telephone subscribers at the margin. For example, Commissioners raised questions regarding the correlation between rates for local, toll, and other services and the level of subscribership in different states. They also asked about the price elasticity of demand for subscriber access and, in particular, what that implies for how residential service should—or should not— be priced.[34]

Below-cost pricing of residential service—still a widespread practice in the majority of states—was traditionally justified on public policy grounds by appealing to what economists call "network externalities," a feature common in network industries like telecommunications. Those externalities refer to additional value created for telephone consumers that is not reflected by the price they pay for residential service and, in particular, connection to the public switched network. Every addition of a customer to the network not only creates direct value to the customer that joins but also increases the value of the network to customers who are *already* subscribing to it. As the community of interest (and the potential number of people that can be reached) increases in size, the value of the network increases as well. In order to encourage precisely this creation of extra value, public policy has used several means to encourage subscribership growth, including the use of subsidies to residential service. The history of such growth in the U.S. has been impressive (up from 35 percent of households with telephones in 1920 to almost 94 percent in 1997).[35] However, it is also true that subscribership growth has been very sluggish ever since the subscribership rate reached 90 percent in 1970.[36] The last 27 years has seen subscribership rise only by 4 percentage points.

The reason for such slow growth (or, more accurately, stagnation) lately is that the value created by network externalities has fallen as participation in the network has increased. That is simply a manifestation of diminishing returns as telephone use and network participation has

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[34] The price elasticity of demand was a subject of discussion between the Commissioners and presenters William Taylor, Don Perry, and William Dunkel.

[35] Federal Communications Commission, Industry Analysis Division, *Trends in Telephone Service*, February 1998. Tables 15.2 and 15.3.

[36] *Id.*

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-28-

increased. As a result, it will get increasingly difficult to induce the subscribership percentage nationwide—which, since 1991, has stagnated at or just below the 94 percent mark—to move toward 100 percent.[37] During this time the economy has seen both a brief downturn and a prolonged upswing, telephone service in general has become less expensive (with residential service rates staying almost flat on average in real terms and certain long distance rates falling), and universal service programs (particularly, Lifeline and Link-Up) have attempted to increase subscribership at the margin.[38]

There are two significant implications of these developments. First, the facts suggest that attention must properly be focused on the *marginal* subscribers, i.e., those households (not very many in number) whose entry and exit from the network—for whatever reasons—keep the subscribership percentage nationwide hovering in the vicinity of 94 percent. Therefore, the affordability issue—which may be relevant for all customers—is of particular significance to those at the margin. Contrary to Mr. Dunkel's claim that any increase in the price of residential service in Florida would sink the state's subscribership rate, there is no clear evidence that such a price increase for the vast majority of telephone customers in Florida balanced by targeted direct subsidies to subscribers at the margin will dramatically reduce network participation in Florida.

Mr. Dunkel claimed that, according to FCC data, average subscribership in the five states with the highest residential service rates is 3.6 percentage points lower than that in the five states with the lowest such rates. In addition, he claimed that Utah's subscribership rate suffered when local rates were increased but recovered when those rates were later reduced. Mr. Dunkel did not provide his data sources or his calculations. Based on publicly available 1997 data, my analysis shows that the five states with the highest residential service prices (adjusted for multiple ILECs and the $3.50 monthly federal subscriber line charge), namely, Georgia, Massachusetts, Mississippi, New York, and West Virginia, had an average

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[37] *Id.*

[38] *Id.*, Tables 13.2 and 14.1. Between 1991 and 1998, 13 states have added Lifeline and 4 have added Link-Up. *Id.*, Table 8.1. With effect from January 1998, Lifeline is now available in all states and territories, and the federal support amount has been increased.

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-29-

subscribership rate of 92.8 percent, which was only 1.7 percentage points below the average subscribership rate of the five states with the lowest prices, namely, Missouri, New Jersey, Texas, Utah, and Virginia. In comparison, Florida's local rates ranked just above those of the lowest five states and the subscribership rate was 92.8 percent in 1997. From a statistical standpoint, there is very little to distinguish these two strata of states in terms of their subscribership patterns despite a noticeable range in residential service rates. If anything, my analysis showed that *median* U.S. subscribership in 1997 was 94.3 percent and that states with subscriberships rates above that median had, on average, about $2,500 more in disposable personal income per capita than states below that median. This would explain why Massachusetts, New York, and New Jersey (drawn from the highest *and* lowest residential service price states), in addition to other high price states like Maryland, New Hampshire, and Rhode Island, all had above-median subscribership in 1997. The state of Utah—Mr. Dunkel's example—is a significant anomaly in these trends.[39]

Second, while there is evidence that states with universal service programs like Lifeline experience only slightly better subscribership growth on the whole than those without, the beneficial impact of Lifeline is more clearly demonstrated by focusing on the marginal subscribers, e.g., households with annual income under $10,000. Consider the overall picture first. States without Lifeline saw a paltry 1 percentage point growth in average subscribership (from 93.3 per cent to 94.4 percent) between 1984 and 1997. In contrast, states *with* Lifeline saw a statistically significant 2.4 percentage point growth (from 91.5 percent to 93.9 percent) over that period. Next, consider only the subscribers with annual becomes below $10,000 in all of those states. States without Lifeline experienced a 3.3 percentage point subscribership growth (from 83.6 to 86.9 percent) among that population segment between 1984 and 1997. In contrast, states *with* Lifeline recorded a much more impressive 6.5 percentage point gain (from 79.3 to 85.8 percent) among that population segment over the same period.[40] This is strong circumstantial evidence that public policy that provides universal service program support to

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[39] Data from the Bureau of the Census, *Statistical Abstract of the United States, 1997*, Table 707, and *Trends in Telephone Service, supra*, fn. 35, Table 15.2.

[40] *Trends in Telephone Service, supra*, fn. 35, Table 15.4.

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-30-

marginal (low-income) subscribers may be quite effective in raising subscribership while residential service price increases to other customers will have little adverse impact on the overall subscribership rate.

B.   Price Elasticity of Demand is a Valuable Guide for Pricing Residential Service

Economists regard the price elasticity of demand as valuable information for understanding how consumers react to price changes. Because demand is inversely related to price, the own-price elasticity of any service reflects how much (in a percentage sense) the demand for a service rises (falls), given a percentage decrease (increase) in the price. The lower that percentage response, i.e., the closer the value of the elasticity to zero, the more *inelastic* or insensitive is the demand to price changes. Conversely, high sensitivity is reflected in higher values of the price elasticity. Threshold values of the elasticity are zero (completely insensitive demand) and one (sensitive in a revenue-neutral way). At zero elasticity, the percentage by which price rises (falls) is also the percentage by which revenue rises (falls), i.e., they move in the same direction. At an elasticity of one, revenue does not change regardless of the percent change in price. At elasticities in excess of one, demand is *elastic*, and price changes in one direction yield revenue changes in the other direction. As price elasticity becomes "very high," even small changes in price can trigger large demand and revenue changes in the opposite direction.

The price elasticity of demand depends on a number of factors: (i) the level of the price itself, (ii) the share of a consumer's total expenditure represented by that service, and (iii) the number of alternatives available for the service in question. Other things being equal, the price elasticity is higher as the level of the price itself is higher, the share in total expenditure is higher, and there are more alternatives (or substitutes) for the service.

Empirical evidence suggests that the own-price elasticity of demand for the subscriber access component of residential service is typically very close to zero.[41] This suggests that the

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[41] See the comprehensive survey in Lester D. Taylor, *Telecommunications Demand in Theory and Practice*, Boston: Kluwer Academic Publishers, 1994, especially Chapter 5.

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Consulting Economists

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-31-

price charged for such access is itself not at a high level, that subscriber access (and residential service, in general) is a relatively small fraction of the subscriber's overall monthly expenditures, and that there are presently few alternatives to the local loop purchased from the ILEC for gaining network access (though this fact is changing with the advent of wireless loops and cellular service). In addition, customers derive significant value (i.e., excess of actual benefit over price) from residential service. It is, therefore, important to understand *all* of the reasons for a low price elasticity for local service.

Consistent with these factors, there is also empirical evidence that the own-price elasticity of demand for subscriber access actually varies by income group. Studies show that as household income is lower, the price elasticity of that service is noticeably higher.[42] This is a credible finding because the price elasticity is expected to rise as telephone service cost becomes an increasingly larger fraction of a consumer's income (hence, expenditures). For those with the lowest income, that fraction is largest and the elasticity is highest.[43] The clear implication is that, in theory, the marginal subscribers (i.e., those at the lowest income levels) are the most likely to adjust demand downward (drop off the network) as the price of residential service increases. However, there are two clear mitigating factors here. First, empirical studies show that the price elasticity for the most vulnerable income segments, while generally higher, remains in the inelastic range. This signifies that any drop-off from the network due to a moderately higher residential service price would be limited. Second, this is precisely the population segment for whom targeted universal service support would go a long way to preserve its participation on the network, even as all other customers are asked to pay a higher price for residential service.

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[42] See, e.g., Lewis J. Perl, "Residential Demand for Telephone Service, 1983," National Economic Research Associates, 1983, and Paul Cain and James M. MacDonald, "Telephone Pricing Stuctures: The Effects on Universal Service," *Journal of Regulatory Economics*, 3, 1991, at 293-308.

[43] This point was explained at the workshop by Don Perry on behalf of GTE. Transcript of FPSC Staff Workshop, October 2, 1998, at 380.

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-32-

C. The Commission Should Disregard Some Misconceptions Regarding the Price Elasticity of Subscriber Access (Residential Service)

The discussions at the workshop revealed the need to avoid certain misconceptions about the price elasticity of demand in order to formulate sensible pricing policies that recognize the value of telephone service.[44]

1. Claim: A price elasticity close to zero signifies that residential service is priced monopolistically and exploitatively

During his first workshop presentation, Mr. Dunkel took exception to my proposal of the well-established inverse-elasticity pricing rule by arguing that "... if you have a monopoly service, that automatically has a lower elasticity." He then exhorted the Commission: "So when you see inelastic, think monopoly services." Mr. Dunkel's basic contention was that in view of the very low price elasticity for residential service, any increase in its price would amount to monopolistic exploitation of hapless consumers.[45]

Mr. Dunkel's reasoning puts the cart before the horse, and even misses an obvious explanation for the low price elasticity. As the empirical evidence discussed above clearly shows, the cost to a consumer of subscribing to the telephone network is a relatively tiny fraction of total income (and expenditure). Other evidence presented at the workshop showed that the cost of local telephone service is low relative to comparable consumer purchases like other utilities or cable service. In addition, the value derived from telephone service is significant. With a low price, high value, and low share of the consumer's budget, residential service is not surprisingly characterized by a low price elasticity of demand. Whether the absence of significant substitutes also causes that elasticity to be low has not been empirically tested yet (because of only scant experience with loop bypass technologies). The fundamental point is that a low price elasticity is *not* automatically a pointer to consumer dependence on a necessity that is only available from a monopoly provider. Unfortunately, that misconception

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[44] Some pricing guidelines were proposed in my *Principles* paper. See Chapter 4.

[45] Transcript of FPSC Staff Workshop, October 1, 1998, at 177-178.

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-33-

often drives public statements that seeking the highest contribution (i.e., pricing above incremental cost) in prices of services with low price elasticities is "unfair." As I remarked during my workshop presentation, while fairness is certainly a matter for public policymakers to consider, high markups in low price elasticity services are economically *efficient* when the purpose is to recover the substantial fixed and shared and common costs of a firm. Moreover, any perceived unfairness to the most vulnerable income groups can easily be mitigated by the use of targeted universal service support programs.

Mr. Dunkel appears to miss another fundamental economic point. An *un*regulated, profit-maximizing monopoly will *never* price its products in a range over which demand is price-inelastic. That is because, as long as demand is inelastic, that monopoly can always increase revenue by raising the price. In fact, the price could continue to rise until the price elasticity itself rises into the elastic range. Because ILECs are regulated, they are unable to exercise this full monopoly power, and present residential service rates are well below what they could be under unfettered monopoly. It is, therefore, incorrect to characterize a moderate increase in the residential service rate as an act of monopoly pricing made possible by a low price elasticity of demand. It is also useful to remember that, if anything, the residential service rate *is below cost* (TSLRIC).

2. Being inelastic in demand does not automatically mean subscribership to residential service will be high

During an exchange between Mr. Perry and Commissioner Garcia, the question came up as to whether subscribership to residential service will be high simply because its price elasticity is very low.[46] If that were indeed true, then the implication would be that any increase in the price of residential service (within a plausible range dictated by affordability) would not endanger current levels of subscribership. It is hard to disentangle the relationship between price elasticity and subscribership levels without duly considering several other factors, namely, the already low level of price (below incremental cost), the substantial value created by subscriber access and related services, the small fraction of income and expenditures that

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[46] Transcript of FPSC Staff Workshop, October 2, 1998, at 376-377.

Costing and Pricing Principles for Determining
Fair and Reasonable Rates Under Competition
FPSC Special Project No. 980000A-SP

-34-

residential service accounts for, etc. If such service is affordable at a higher price than that prevailing currently in Florida, then it must already be affordable at the prevailing price. That would imply that residential service is affordable to the vast majority of Florida citizens *despite* the price. This factor (termed the *income* elasticity of demand by economists) is an additional aspect of the explanation for the current level of subscribership. Poorer consumers tend to have higher income elasticities which means that lower incomes translate into lower demand for service. Fortunately, (i) targeted universal service support can be the answer, and (ii) the vulnerable income group is a relatively small proportion of the population.[47]

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[47] In the Southern states, expenditures on *all* telephone services (not just residential service) account for just over 2 percent of household income. Also, in those states, households making $10,000 or less in annual income are less than 9 percent of all households. In Florida, about 16 percent of *individuals* (not households) were at or below the poverty line in 1995. Source: Bureau of the Census, *Statistical Abstract of the United States, 1997*, Tables 713, 728, and 741.